

Enumerating phytoplankton abundance in ballast water treatment experiments

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Ballast water discharge is recognized as a pathway of introduction for potentially harmful, non-indigenous species of phytoplankton into coastal waters. Various ballast water treatment options have been proposed to reduce the abundance of these organisms before discharge. We are testing the use of the Most Probable Number (MPN) technique, a dilution based culture method, to enumerate viable phytoplankton cells after a potential treatment. This enumeration method confers a strong advantage compared to cell presence/absence methods of traditional microscopy, because a cell present after treatment may not be capable of growth. In our experiments, phytoplankton samples from control and treatment groups were used to inoculate growth medium (f/2) over a dilution series. These samples were then transferred to incubators set to optimize growth. The pattern of growth over the dilution series allows for a calculation of the MPN, an estimate of the number of viable cells per ml. The effectiveness of a particular treatment at reducing the number of viable phytoplankton is determined by comparing control and treatment abundance estimates. We present the results of a test designed to evaluate the effectiveness of a potential ballast water treatment system, which combines filtration and hypochlorite treatment, at reducing numbers of phytoplankton from Puget Sound water samples.